

460.	Class I Bituminous Concrete Pavement, Type I-1	Metric Ton
460.2	Class I Bituminous Concrete Pavement Type I-1 Open Graded	Metric Ton
461.	Class I Dense Bituminous Concrete, Type ST	Metric Ton
462.	Class I Dense Binder Course for Bridges	Metric Ton
464.	Bitumen for Tack Coat	Liter
464.5	Hot Poured Rubberized Asphalt Sealer	Meter

## SECTION 466

### STRESS ABSORBING MEMBRANE INTERLAYER

#### DESCRIPTION

##### 466.20 General.

This work consists of the application of hot, rubberized asphalt to a paved surface and immediately embedding aggregate therein by spreading and rolling in accordance with these specifications. This item may also be referred to as SAMI.

#### MATERIALS

##### 466.40 General.

Asphalt: Asphalt cement for the asphalt rubber mixture shall be AC-10 or AC-20, complying with the requirements of M3.01.0. If AC-10 is used, the SAMI shall be overlayed within ten (10) days.

Rubber: The granulated rubber shall be a vulcanized rubber product from the ambient temperature processing of pneumatic tires.

The granulated rubber type shall meet the following gradation:

Sieve Designation	Percent Passing
2.36 mm	100
2.00 mm	95-100
1.18 mm	—
600 µm	0-10
300 µm	0-5

Aggregate shall conform to the requirements of M2.01.0 for crushed stone. Crushed gravel stone *will not* be permitted. Gradation requirements will conform to M2.01.6. Percentage of wear as determined by the Los Angeles Abrasion Test (AASHTO T 96) shall be a maximum of 30.

#### CONSTRUCTION METHODS

##### 466.60 General.

##### Preparation of Existing Surface.

Prior to application of the rubberized asphalt, the entire paved surface to be treated shall be cleaned by sweeping, blowing and other methods until free of dirt and loose particles. Pot holes, depressions, cracks larger than 20 millimeters and other irregularities will be patched with hot bituminous mix and compacted. No water shall be present on the surface. A levelling course shall be placed on planed, milled or existing surface if required.

**Seasonal and Weather Limitations.**

Construction shall not proceed when the ambient temperature has been below 10 °C within the previous 12 hours, when rain is falling, or when conditions are unfavorable to obtaining a uniform spread.

**466.61 Asphalt Rubber Mixing and Reaction**

The percent of rubber shall be  $23 \pm 2\%$  as indicated by the mixture design for specific project requirements by weight of total mixture, that is, by total weight of asphalt cement, plus granulated rubber.

The temperature of the asphalt shall be between 175 °C and 220 °C at the time of addition of the vulcanized rubber. The asphalt and rubber shall be combined and mixed together in a blender unit and reacted in the distributor for a period of time as required by the Engineer which shall be based on laboratory testing by the rubberized asphalt supplier. The temperature of the rubberized asphalt mixture shall be above 160 °C during the reaction period.

After the reaction between asphalt and rubber has occurred, the viscosity of the hot rubberized asphalt mixture may be adjusted for spraying and/or better “wetting” of the cover material by the addition of a diluent. The diluent shall comply with the requirements of ASTM D 369, Grade #1 Fuel Oil and shall not exceed 7.5 percent by volume of the hot asphalt rubber mixture.

When a job delay occurs after full reaction, the rubberized asphalt may be allowed to cool. The rubberized asphalt shall be reheated slowly just prior to application, but not to a temperature exceeding 160 °C. An additional quantity of diluent not exceeding 3 percent by volume of the hot rubberized asphalt mixture may be added after reheating.

Viscosities shall be run, by the applicator, on each blended load of rubberized asphalt rubber using a Haake Field viscometer. One viscosity prior to the induction of the diluent and one after the induction of the diluent blended into the asphalt and rubber mixture. The viscosity of the final product shall be in the range of 2 to 5 Pascal seconds.

**466.62 Equipment.**

**1. Distributor Truck.**

At least two pressure-type bituminous semi-distributor trucks in good condition will be required. The distributor shall be equipped with an internal heating device capable of heating the material evenly up to 200 °C; have adequate pump capacity to maintain a high rate of circulation in the tank; have adequate pressure devices and suitable manifolds to provide constant positive cut off to prevent dripping from the nozzles. The distribution bar on the distributor shall be fully circulating. Any distributor that produces a streaked or irregular distribution of the material shall be promptly repaired or removed from the project.

Distributor equipment shall include a tachometer, pressure gauges, volume measuring devices, a thermometer for reading temperature of tank contents, and an internal auger to maintain proper mixture and blending of asphalt and rubber. Controls for spray bar shall be located in cab of truck, for controlling width and rate of spray of product.

It shall be so constructed that uniform applications may be made at the specified rate per square meter within a tolerance of plus or minus 0.20 liters per square meter.

**2. Brooms.**

Revolving brooms shall be so constructed as to sweep clean or redistribute aggregate without damage to the rubberized-asphalt membrane or surface treatment.

**3. Pneumatic-Tired Roller.**

There shall be at least two multiple wheel self-propelled pneumatic-tired rollers with provisions for loading 7 to 11 metric tons as deemed necessary. Pneumatic-tired rollers shall have a total compacting width of at least 1.5 meters and shall have a minimum tire pressure of 415 kiloPascals. A minimum of three rollers are required, two pneumatic and one steel.

**4. Power Rollers.**

Shall be self-propelled steel rollers weighing between 1.5 and 5 metric tons.

**5. Asphalt Heating Tank.**

To heat the asphalt cement to the necessary temperature for blending with the rubber, tank shall be a minimum 10 cubic meter capacity and capable of heating product at a minimum rate of 15 °C per hour.

**6. Mechanical Blender.**

For proper proportioning and thorough mixing of the asphalt and rubber together to produce the specified rubber content material. This unit shall have both an asphalt totalizing meter (liters) and a flow rate meter (liters per minute), positive placement auger to feed rubber properly to mix chamber at the specified rate, and an auger in mixing chamber running through a static motionless mixer.

**7. Distributor.**

Shall include a tachometer, pressure gauges, volume measuring devices, a thermometer, a 300 millimeter auger capable of blending and maintaining proper blending of material and an 200 millimeter dual positive placement gear head pump capable of spraying the rubberized asphalt at a viscosity of 2 to 5 Pascal seconds.

A "bootman" shall accompany the distributor and ride in a position so that all spray bar nozzles are in his/her full view and readily accessible for unplugging.

**8. Chip Spreader.**

This equipment shall be self-propelled and be adjustable to control and spread accurately the given amounts of cover aggregate per square meter. It shall have a width of spread of not less than 3.75 meters. Cut off plates shall be provided to permit the width of spread to be reduced in increments of 125 millimeters from the maximum width specified. The spreader shall be equipped with a hitch at the rear so it can lock onto the hauling trucks while they are discharged into the spreader. Two (2) conveyor belts shall supply aggregate from the hopper to the element which spreads the cover aggregate over the road surface. Screen below screw auger at bottom of hopper shall be in place.

**466.63 Construction Requirements.**

The rubberized asphalt mixture shall be applied at a temperature of 140 °C to 170 °C at a rate of  $2.75 \pm 0.25$  liters per square meter. Transverse joints shall be constructed by placing building paper across and over the end of the previous rubberized asphalt application. Once the spraying has progressed beyond the paper, the paper shall be removed immediately and disposed of as directed by the Engineer. Longitudinal joints shall be overlapped from 100 to 150 millimeters.

If rubberized asphalt is applied directly to an old existing Portland Cement Concrete pavement, band-aid strips shall be placed prior to the rubberized asphalt treatment on all transverse and longitudinal joints. The strips shall be Pave-Prep, Polygard, Rol-Glas or equal and shall be placed 500 millimeters wide. The SAMI shall be applied within four days of the placement of the band-aid strips.

**1. Application.**

No application shall be made to any area which cannot immediately be covered with aggregate.

The application from the distributor shall be stopped before the tank is empty to be sure the application does not run light. At all starts, intersections, junctions at transverse joints with previous spreads or other pavements, provision shall be made to ensure that the distributor nozzles are operated at full force when the application begins. Building paper or other suitable devices shall be used to receive the initial application from the nozzle before any material reaches the surface at the transverse joint. The paper shall be removed immediately after use without spilling surplus material on the surface. Longitudinal joints shall be reasonably true to line and parallel to centerline. The overlap in application of asphalt-rubber material shall be minimum to assure complete coverage. Where any construction joint occurs, the edges shall be broomed back and blended so there are no gaps and the elevations are the same, and free from ridges and depressions.

During application, adequate provision shall be made to prevent marring and discoloration of adjacent pavements, structures, vehicles, foliage or personal property.

**2. Aggregate Application.**

The application of aggregate shall follow as close as possible behind the application of the hot rubberized asphalt which shall not be spread further in advance of the aggregate spread that can be immediately covered. Construction equipment or other vehicles shall not drive on the uncovered rubberized asphalt.

The dry aggregate, pre-coated with 0.5 to 1.0% of AC-20, shall be spread uniformly by a self-propelled spreader at a rate of spread directed by the Engineer, generally between 15 and 20 kilograms per square meter.

Any deficient areas shall be covered with additional material.

Prior to application, the aggregate shall be pre-heated to a temperature between 120 °C to 150° °C and coated with 0.5 to 1.0% of asphalt, grade AC-20.

**3. Rolling.**

Rolling shall commence immediately following spread of aggregate. There shall be at least three complete passes by the pneumatic tired rollers to embed the aggregate particles firmly into the rubberized asphalt, followed by an additional pass of the steel roller.

**4. Sweeping.**

When the maximum of aggregate has been embedded into the rubberized asphalt and the pavement has cooled, all loose material shall be swept or otherwise removed at such time and in such a manner as will not displace any embedded aggregate or damage the rubberized asphalt.

**5. Curing.**

The rubberized asphalt surface treatment should be overlaid immediately following completion of sweeping. If traffic must travel over the surface treatment, it shall be allowed to cool and speed controlled so as not to exceed 40 kilometers per hour.

## COMPENSATION

**466.80 Method of Measurement.**

Stress Absorbing Membrane Interlayer will be measured by the square meter and shall be the actual number of square meters applied as directed by the Engineer.

**466.81 Basis of Payment.**

Stress Absorbing Membrane Interlayer shall be paid at the contract unit price per square meter and payment shall be full compensation for all labor, materials and equipment required to complete the work to the satisfaction of the Engineer.

**466.82 Payment Items.**

460.	Class I Bituminous Concrete Pavement Type I-1	Metric Ton
466.	Stress Absorbing Membrane Interlayer	Square Meter

## SECTION 468

### PEASTONE COVER FOR BITUMINOUS CONCRETE PAVED SHOULDERS

#### DESCRIPTION

**468.20 General.**

Peastone cover for bituminous concrete paved shoulders will consist of an application of bitumen on the finished surface of the shoulder and then a cover of peastone spread and rolled in accordance with these specifications.

#### MATERIALS

**468.40 General.**

Materials shall meet the requirements of the following Subsections of Division III, Materials: